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REPAIRS TO A FLEXIBLE-JOINTED PIPE UNDER THE EAST RIVER TO BLACKWELLS ISLAND[1]

By George E. Rodman[2]

Blackwells Island is supplied with water from Manhattan by a 12-inch flexible-jointed pipe about 1000 feet long laid in 1908 under the East River from the foot of East 68th Street, and by a 12-inch steel pipe over the Queensboro Bridge, laid in 1917. Complaint was received on September 20, 1919, of lack of pressure on the Island, it having dropped from 39 to 15 pounds. Investigation showed leakage at the rate of about 3,000,000 gallons in 24 hours on the line under the river and this line was shut off.

The services of a diver were obtained on September 21, and an air compressor was connected to the line so that the escaping air showing in the river would determine the location of the leak. The capacity of the compressor was 24 cubic feet of free air per minute, and it could maintain a pressure of 125 pounds. It was only used under about 20 pounds on this job.

As the air was escaping from the line about 50 feet from the shore, the diver cleaned off the pipe at the bulkhead line and followed it out to where the air was escaping, it being necessary to remove considerable mud and some stones from over the pipe, which was in about 45 feet of water at this point. Owing to the current being about 5 feet a second, the diver could only work on slack water, working for periods of about an hour each on two tides a day. The mud was from 3 to 4 feet deep over the pipe and was washed away by a water jet supplied from a fire hydrant on shore, 2½-inch hose being used from the hydrant to the launch and 2-inch hose ending with a piece of 2-inch iron pipe about 4 feet long from the launch to the river bottom.

Upon uncovering the pipe it was found that a split sleeve had been placed over the joint that was leaking, and that the bolts and washers holding the split sleeve together had rusted away so that the sleeve was partly off the pipe. The gaskets between the two halves of the sleeve had been made of what appeared to be several thicknesses of rubber fiber hose, and this was badly disintegrated. The joints on the ends of the sleeve were originally made with lead wool, but most of this had been washed away.

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[1] Read before the New York Section, December 11, 1919. Discussions are invited and should be sent to the Editor.

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The upper half of the sleeve was raised to the surface, cleaned off and replaced over the joint. It was necessary to use several ⅛-inch lead gaskets between the halves, as the angle formed by the two lengths of pipe would not permit them to meet and leave a space for the lead calking at the ends.

It was at first proposed to use a nickel alloy for the bolts and washers on this sleeve, but the department was advised that when it was used under water in connection with iron the results might be unsatisfactory. A bronze was accordingly used for the 48 ½-inch by 3½-inch bolts and 96 washers which cost $15.60. This use of bronze is more or less experimental, for information concerning the best material for bolts for such sleeves, submerged in salt water, is very scanty.

Although the bolt holes in the flanges of the sleeve were ⅞-inch, the original bolts were but ⅜-inch and the diver asked that the new ones be not larger than ½-inch on account of the difficulty in making the two sets of holes meet under water.

After the sleeve was bolted in place, the space at the ends was calked with lead wool. A meter test showed that the leakage on the entire line was only at the rate of 36,000 gallons in 24 hours, so the line was put in service on October 6.

The cost of the repair was $1,388.60. If bolts and washers of a non-rusting or non-corroding metal had been used originally, it is probable this repair job would never have been necessary. It is suggested, therefore, that any member who has had an opportunity to observe the life of steel or alloy bolts on iron or steel parts submerged in salt water will do a real service to engineers by sending to the Editor of the JOURNAL a statement of his observations.